

# Voting System Examination

## Hart InterCivic

Prepared for the  
Secretary of State of Texas

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Designee of the Attorney General

This report conveys the findings of the Attorney General's designee from an examination of the equipment listed, pursuant to Title 9, Chapter 122 of the Texas Election Code, section 122.036(b).

<b>Examination Date</b>	May 25, 2005
<b>Report Date</b>	June 13, 2005

<b>Component</b>	<b>Version</b>	<b>NASED Number</b>
Ballot Origination Software System (BOSS)	4.1.4	Not yet approved
Ballot Now: Paper Ballots	3.10	Not yet approved
Tally (Vote Tabulation System)	4.1.1	Not yet approved
Rally (Vote Transfers to Tally)	2.1.1	Not yet approved
Servo (Warehouse Software)	4.0.2	Not yet approved
Electronic Crypto Module (eCM)	1.0.7	Not yet approved
eSlate Voting Station	3.1.3	Not yet approved
Judges Booth Controller (JBC)	3.1.3	Not yet approved
eScan Precinct Scanner	1.0.3	Not yet approved

### Improvements

- A security review has been performed by Symantec, and security updates have been added. These security updates are pervasive and touch every component listed above. An additional layer of security has been added, using a key that is generated by the jurisdiction and stored in an Electronic Crypto Module (or eCM), which is a USB security dongle. The security key in the eCM can be copied only by Hart's eCM Manager program, because each eCM has a serial number. The eCM must be present for Tally, BOSS, Rally, Ballot Now or Servo (warehouse software) to create or use a Mobile Ballot Box (MBB)
- The eScan precinct scanner has been added. See below for details.

## Notes

- The overall system is referred to as System 5.0, even though the version numbers of the individual components do not contain 5.0.
- The previous version, System 4.0 was never certified in Texas.
- Hart is ISO 9000 certified, so their engineering processes are certified by an external agency. This is a very positive factor.

### **DRE System: eSlate Precinct Voting System (PVS), eScan Precinct Scanner, and Judges Booth Controller (JBC)**

Election Setup	PCMCIA card (Mobile Ballot Box, or MBB) created with BOSS election setup software
Zero-total report	On a thermal printer, which is found on both the Judge's Booth Controller (JBC) and on the eScan.
Authorization to vote / Ballot selection	For the eSlate, a four-digit authorization code is issued to each voter on a tape printed at the election judge's controller.
Provisional Ballots	<p>The system allows ballots to be designated as provisional, automatically assigns a recall number to each one, and prints it out. Each eSlate provisional ballot can later be included in the tally or can remain excluded. Recall numbers are automatically assigned to provisional eSlate ballots and the recall numbers are printed, so transcription errors are avoided; this is preferable to manually assigning them, as some systems require.</p> <p>With the eScan, provisional ballots must be handled with a manual envelope system, where ballots are not scanned until they are accepted.</p>
View / Vote	For the eSlate, LCD display / selection wheel and keys
Vote Storage	Flash memory (called a Mobile Ballot Box, or MBB)
Precinct Consolidation	Not applicable when only eSlates are used, because precinct results are all accumulated together in the Judge's Booth Controller (JBC). If both eSlates and eScans are used in the same precinct, consolidation is done on one of the eScans, but only for the purpose of creating the precinct report. All the MBBs from both eSlates and eScans are carried to election central.
Transfer Results	Flash memory (MBB) used to send to Tally software. Protected by a hash on each vote record. The Electronic Crypto Module (or eCM, a USB dongle) must be present for Tally, BOSS, Rally, Ballot Now or Servo (warehouse software) to create or use a Mobile Ballot Box (MBB).
Print precinct results	On thermal printer. There is a thermal printer on the JBC and on the eScan. If both are used in the precinct, the precinct report is printed on the eScan.
Straight party / crossover	Yes. A warning is given if a straight party vote cancels a crossover vote that has already been selected. This prevents straight-party voting from having an effect the voter did not intend.
Precinct Scanning	The eScan precinct scanner integrates with the precinct system. Results from the JBC can be placed on an MBB and plugged into the eScan, which then produces the precinct report with totals from both the DREs connected to the

	JBC and the eSlate precinct scanner.
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### Tabulation and Transmission Software: Tally and Rally

Results Storage	Sybase SQL Anywhere
OS access	Not permitted during tabulation. You can restart the system, but it is logged.
Real-Time Audit Log	Yes.
Data Integrity	Sybase SQL Anywhere implements transaction protection (using a log file), so that either all the data in a transaction is posted, or none of it is.
Transmission	The Rally system can be placed in a regional center to collect results and forward them to the central counting location. No tabulation is done. It merely accepts precinct results and forwards them. All transactions are logged.

### Ballot Printing Software & Ballot Scanning: Ballot Now & BOSS

Election Setup	PCMCIA card (MBB) created with BOSS election setup software
Ballot Scanning	<ul style="list-style-type: none"> <li>• BOSS can scan ballots, allow manual interpretation of any undervotes or overvotes, and create Cast Vote Records (CVRs) that can be input into Tally.</li> <li>• A number of scanners are certified for use with BOSS.</li> </ul>
Notes	<ul style="list-style-type: none"> <li>• Ballots are produced on demand</li> <li>• Each ballot has a serial number and a bar code, which prevents ballots from being counted twice by the Tally software.</li> <li>• Especially good for absentee ballots</li> </ul>

### Concerns

1. Hart has a program called ResetPVS, which clears all the votes on a JBC, MBB and eSlates. This utility is intended for use by Hart personnel only, and they say it is not given to counties. Its purpose is to allow their employees to clear election data without loading the particular version of their software that is being used by the county.

This is not acceptable. One person working alone could obtain a copy of this program (for example by theft or bribery) and completely erase the data of entire polling locations quickly and without leaving a trace. Obviously, no data is ever 100% secure, but election systems should do everything possible to make it difficult to destroy or lose vote records.

Furthermore, since the tool already exists and there is no way to know how many copies there are, existing Hart systems are at risk until the JBC software is updated to a version that does not have this vulnerability.

**Recommendation:** Hart should be given a reasonable amount of time (I recommend nine months) to fix this problem and update all existing systems in Texas. At the end of the time, all Hart systems that have this vulnerability should be decertified.

2. The eScan is extremely sensitive to stray marks. If the voter allows even a very small part of a mark to stray into a neighboring box, an overvote can result. Fortunately, overvotes are caught in time for the voter to correct them, because this is a precinct scanner. If the voter can identify the stray mark, he can erase it. Otherwise, he must spoil the ballot and vote again. Although this is not a fatal problem, there can be significant inconvenience.

**Recommendation:** For now, we should simply be aware of this and see if it turns out to be a problem in practice. I recommend that Hart tune the software so that the scanner strikes a reasonable balance between ignoring marks that the user intended and recording marks he did not intend. Another possibility is to address this with voter instructions.

3. If the same ballot is scanned by an eScan and by Ballot Now, it will be counted twice. This is not a big enough problem to prevent certification, since many systems will count ballots twice if they are scanned twice. However, since the Hart system normally refuses to count the same ballot twice, election officials may become somewhat lax about enforcing procedures to prevent this.

**Recommendation:** Hart should warn counties of the importance of keeping eScan ballots separate from Ballot Now ballots, so they are not scanned twice.